

United States Patent [19]
Yukitake et al.

[11] Patent Number: 5,745,182
[45] Date of Patent: Apr. 28, 1998

[54] METHOD FOR DETERMINING MOTION
COMPENSATION

0395440A2 10/1990 European Pat. Off. .
0447068A2 9/1991 European Pat. Off. .
0484140A2 5/1992 European Pat. Off. .

[75] Inventors: Takeshi Yukitake; Shuji Inoue, both of
Yokohama, Japan

OTHER PUBLICATIONS

[73] Assignee: Matsushita Electric Industrial Co.,
Ltd., Osaka, Japan

A. Puri, et al, "Video Coding with Motion-Compensated
Interpolation for CD-ROM Applications", Signal Process-
ing. Image Communication, vol. 2, No. 2, pp. 127-144, Aug.
1990.

[21] Appl. No.: 278,010

K. Kinuhata, et al, "Universal Digital TV Codec —Unico-
dec", 7th International Conference on Digital Satellite Com-
munications. May 1986, pp. 281-288.

[22] Filed: Jul. 20, 1994

Related U.S. Application Data

(List continued on next page.)

[62] Division of Ser. No. 970,046, Nov. 2, 1992, Pat. No.
5,369,449.

[30] Foreign Application Priority Data

Nov. 8, 1991 [JP] Japan 3-293004
Jul. 9, 1992 [JP] Japan 4-181980

[51] Int. Cl.⁶ H04N 7/32
[52] U.S. Cl. 348/416; 348/699
[58] Field of Search 348/413, 416,
348/699, 400-402, 407, 409-412, 384,
390, 415; 382/232, 236, 238; H04N 7/137

[56] References Cited

U.S. PATENT DOCUMENTS

4,691,230 9/1987 Kaneko et al. 348/699
4,862,266 8/1989 Gillard 348/699
4,864,294 9/1989 Gillard .
4,989,089 1/1991 Chantelou et al. .

(List continued on next page)

FOREIGN PATENT DOCUMENTS

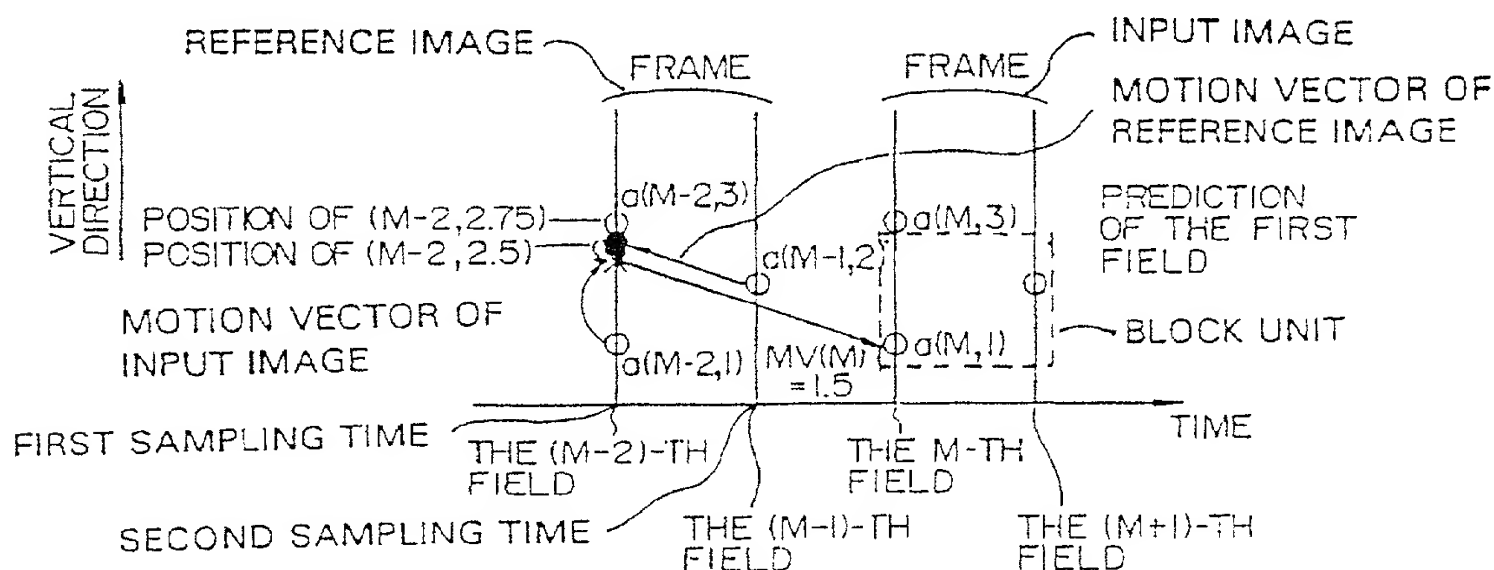
0395271A2 10/1990 European Pat. Off. .

Primary Examiner—Richard Lee
Attorney, Agent, or Firm—Watson Cole Stevens Davis,
P.L.L.C.

[57] ABSTRACT

A method for predicting motion compensation for determin-
ing of an input image based on a motion vector of the input
image from this input image to a reference image which has
been sampled at a first set time, and the method includes
calculating a motion vector of the input image based on a
move, at a second set time, of a block unit which is a part
of the input image and consists of a plurality of pixels, and
calculating a motion vector of the reference image based on
a move, at the first set time, of a block unit which is a part
of the reference image and consists of a plurality of pixels.
Move compensation of the input image is calculated both
from the motion vector of the input image and from the
motion vector of the reference image, to thereby realize a
method for determining motion compensation with high
precision.

3 Claims, 6 Drawing Sheets



U.S. PATENT DOCUMENTS

| | | | |
|-----------|---------|-------------------------|---------|
| 4,998,168 | 3/1991 | Gillard | 348/699 |
| 5,021,881 | 6/1991 | Avis et al. | 348/699 |
| 5,027,205 | 6/1991 | Avis et al. | 348/699 |
| 5,036,393 | 7/1991 | Samad et al. | 348/699 |
| 5,049,991 | 9/1991 | Niihara | 358/105 |
| 5,072,293 | 12/1991 | De Haan et al. | 348/699 |
| 5,093,720 | 3/1992 | Krause et al. | 358/133 |
| 5,105,271 | 4/1992 | Niihara | 358/105 |
| 5,132,792 | 7/1992 | Yonemitsu et al. | 358/105 |
| 5,138,446 | 8/1992 | Guichard et al. | 348/699 |
| 5,142,361 | 8/1992 | Tayama et al. | 348/699 |
| 5,144,427 | 9/1992 | Kitaura et al. | 358/105 |
| 5,157,742 | 10/1992 | Niihara | 348/699 |
| 5,162,907 | 11/1992 | Keating et al. | 358/105 |
| 5,175,618 | 12/1992 | Ueda et al. | 358/105 |
| 5,191,414 | 3/1993 | Sugiyama . | |
| 5,200,820 | 4/1993 | Gharavi | 358/105 |
| 5,210,605 | 5/1993 | Zaccarin et al. | 358/105 |
| 5,424,779 | 6/1995 | Odaka et al. | 348/699 |
| 5,436,674 | 7/1995 | Hirabayashi et al. | 348/699 |

OTHER PUBLICATIONS

M. Hoetter, "Differential Estimation of the Global Motion Parameters Zoom and Pan", Signal Processing. European Journal Devoted to the Methods and Applications of Signal Processing, vol. 16, No. 3, Mar. 1989, pp. 249-265.

Patent Abstracts of Japan, vol. 016, No. 097 (E-1176) 10 Mar. 1992 & JP-A-03 276 988 (Victor Company of Japan Ltd) 9 Dec. 1991.

"Transmission of Component-Coded Digital Television Signals for Contribution-Quality Applications at the Third Hierarchical Level of CCITT Recommendation G.702," CCITT Recommendation 723 of CMTT, 1990.

Takeshi Yukitake, "Field-Time Adjusted MC for Frame-Base Coding (2)" International Organization for Standardization ISO/IEC/JTC1/SC29/WG11 MPEG92/100, Mar. 11, 1992.

Takeshi Yukitake, "Field-Time Adjusted MC for Frame-Base Coding" CCITT SGXV Working Party XV/1 Experts Group for ATM Video Coding, AVC-194 MPEG 92/024s, Dec. 1991.

Shuji Inoue, et al "Motion Compensation Method for Interlace Video" Spring conference of the Institute of Electronics Information and Communication Engineers of Japan, 1992.

09961-0360-1